IMPACT OF BOI INCENTIVES ON RATE OF RETURN, FACTOR PRICES AND RELATIVE FACTOR USE: A COMPARATIVE ANALYSIS OF INCENTIVES UNDER THE OMNIBUS INVESTMENTS CODE OF 1981 (P.D.1789) AND THE INVESTMENT INCENTIVE POLICY ACT (B.P.391)

by

ROSARIO G. MANASAN

STAFF PAPER SERIES 86-01

January 1986

---

*Research Fellow, Philippine Institute for Development Studies (PIDS). The author wishes to acknowledge Ms. Anicia C. Sayos for her able research assistance, and Ms. Juanita E. Tolentino for word processing support.

IMPACT OF BOI INCENTIVES ON RATE OF RETURN, FACTOR PRICES AND RELATIVE FACTOR USE: A COMPARATIVE ANALYSIS OF INCENTIVES UNDER THE OMNIBUS INVESTMENTS CODE OF 1981 (P.D. 1789) AND THE INVESTMENT INCENTIVE POLICY ACT (B.P. 391)

by

ROSARIO G. MANASAN*

1.0 Introduction

Since the termination of U.S. sovereignty in the Philippines, various incentive laws have been enacted as part of the government's industrialization scheme. The first such law passed in the post war period was Republic Act (RA) 35 or the New and Necessary Industries Act of 1946. It granted "new and necessary industries" exemptions from all internal taxes (tariffs not included) for a period of four (4) years from the date of organization of the industry. In 1953, RA 901 supplanted RA 35 and broadened the tax exemptions accorded to favored industries by including exemption from customs duties. Tax privileges were extended from four to six years with an additional four year transition period during which the proportion of tax exemption gradually declined to zero. In 1961, the Basic Industries Law (RA 3127) was passed. It provided for diminishing tax exemptions on importations of machinery, equipment and spare parts of "basic industries" until 1970.

---

*Research Fellow, Philippine Institute for Development Studies. The author wishes to acknowledge Ms. Anicia C. Sayos for her able research assistance, and Ms. Juanita E. Tolentino for word processing support.

In 1967, the Investments Incentives Act (RA 5186) was passed. It is generally considered as the single most important industrial incentive legislation enacted in the Philippines. It provided a wide range of fiscal and other benefits to firms investing in priority industrial sectors registered with the Board of Investments (BOI). Investments were classified as either "pioneer", i.e. those that introduce new products or processes in the market, or "preferred", i.e. those in which existing capacity is deemed to fall short of domestic market demand and export potential. The more important fiscal incentives in RA 5186 exhibit a capital cheapening effect, namely: accelerated depreciation, tax exemption on imported capital equipment, tax credit on domestic capital equipment, expansion reinvestment allowance and tax credit for withholding tax on interest. Other incentives included were: net operating loss carry over, deduction from taxable income of organizational and preoperating expense, exemption from all taxes except income tax (for pioneer projects only).

As a complimentary measure to the Investments Incentives Act, the Export Incentives Act (RA 6135) was enacted in 1970. In addition to most of the incentives granted under RA 5186, RA 6135 provided for tax credit equal to sales, compensating, specific taxes and duties on raw materials and semi-manufactured products used in the

production for export exemption from export tax impost and fees, double deduction from taxable income of shipping costs and promotional expense for exports, to all exporter producers, export traders and service exporters registered with the BOI. As a prerequisite to registration, enterprises must be exporting at least 50 percent of their output or must be producing products listed under EPP of the BOI.

After the declaration of martial law in 1972, several presidential decrees have been promulgated amending both the Investments and Exports Incentives Act. PD 62 (January 1973) liberalized the required conditions for the availment of the deduction from taxable income of expansion reinvestment, extended the availability of tax credit on sales, compensating and specific taxes and duties on supplies, raw materials and semi manufactured products used in export production from 10 years since start of commercial operations to an indefinite period, provided for the additional deduction from gross income of one-half of the value of labor training expenses incurred for upgrading the efficiency of unskilled labor and the double deduction of direct labor and local raw materials cost up to a maximum of 25 per cent of export revenue, abolished the double deduction of promotional expenses and shipping costs of exporting firms provided under RA 5186, and limits the

expansion reinvestment allowance from 100 percent to 25 - 50 per cent and 50 - 100 per cent, respectively, for expansion of non-pioneer and pioneer projects, respectively. PD 485 (June 1974) granted partial, instead of full, exemption from customs duties and compensating tax on imported capital equipment to firms whose total assets exceed ₱500,000 (the reduction depending on the firm's imported capital equipment per worker ratio), withdraw the application of certain incentives granted under RA 5186 and RA 6135 when the registered enterprise has a paid up capital of at least ₱500,000 and earns profits in excess of 33.5 per cent of equity for at least two years (See Table 1) for list of fiscal incentives under RA 6135 as amended).

If an export producer locates its plant in an area designated by the BOI as necessary for the proper dispersal of industry, it was entitled under RA 6135 as amended, to the following additional incentives: 1) an additional deduction from taxable income equal to the direct labor cost of exports and; 2) a tax credit equal to 100 per cent of the cost of necessary infrastructure such as portworks, waterworks, roads, and the like undertaken by the firm.

PD 1789, otherwise known as the Omnibus Investments Code, was issued in January 1981. It revised, integrated and codified the provisions of RA 5186 and RA 6135. The

fiscal incentives provided under 1789 are basically the same as those granted under RA 5186 and RA 6135.

In April 1983, Investment Incentive Policy Act was passed by the legislature. The new incentive scheme, which is still administered by the BOI, has only eight (8) fiscal incentives compared to PD 1789's 14 (Table 1). Most of the capital related incentives were withdrawn, e.g. accelerated depreciation and expansion reinvestment allowance. While exemption from duties and taxes on imported capital equipment and tax credit on domestic capital equipment are still available to exporting firms, non-exporting firms essentially obtain an interest free loan equivalent to these taxes and duties on capital equipment payable in the first five (5) years of commercial operation i.e. non-exporting firms are allowed to defer payment of duties and taxes on machinery and capital equipment. Two incentives are entirely new: (1) tax credit on net value earned which is defined as value of sales less cost of raw materials and components, supplies and utilities and depreciation of capital equipment and (2) tax credit on net local content of exporters defined as value of export sales less depreciation of capital equipment and the value of imported raw materials and supplies.

Table 1 summarizes the fiscal incentives under RA 5186, RA 6135, PD 1789 and BP 391.

Table I

FISCAL INCENTIVES UNDER RA 5186, RA 6135, PD 1789, AND BP 391

	RA 5186				RA 6135		PD 1789				BP 391			
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
A. DEDUCTIONS FROM TAXABLE INCOME OF:														
1. Organizational and pre-operational expenses.	✓ (in first ten years)	✓	✓	✓			✓ (in first ten years)	✓	✓	✓				
2. Accelerated depreciation.	✓	✓	✓	✓			✓	✓	✓	✓				
3. Net operating loss carry-over.	✓ (in first 10 years)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4. A certain percentage of the amount of undistributed profits transferred to capital stock for procurement of machinery and equipment for expansion in the year of payment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

	EO 226				PD 1789						BP 391			
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
5. Labor training expenses equivalent to 1/2 expenses but not more than 10% of direct labor wage.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6. Direct labor cost and local raw materials utilized in the manufacture of export products but not exceeding 25% of the total export revenues for producers, 10% of total export sales for traders and 50% of toral export fees for service exporters.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
In the case of traditional exports, local raw material component is not included in the computation of said deduction.	(		in			first			3			years		)

	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
5. Labor training expenses equivalent to 1/2 expenses but not more than 10% of direct labor wage.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6. Direct labor cost and local raw materials utilized in the manufacture of export products but not exceeding 25% of the total export revenues for producers, 10% of total export sales for traders and 30% of total export fees for service exporters. In the case of traditional exports, local raw material component is not included in the computation of said deduction.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

	RA 5186				RA 6135		PD 1789				EO 391			
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
7. Additional deduction from taxable income of 1% of incremental export sales for use of Philippine brand name.					✓	✓	✓ (first 5 years)	✓						
B. TAX EXEMPTIONS:														
8. Exemption/Reduction/ Deferment from tariff duties and compensating tax on importations of machinery equipment and spare parts.	✓ (full exemption within 7 years)	✓	✓	✓	✓ (full exemption within 5 years)	✓	✓ full exemption within 7 years	✓ 50% reduction within 7 years	✓ full exemption within 7 years	✓ 50% reduction within 7 years	✓ full exemption within 3 years	✓	✓ up to 100% deferment within 5 years	✓ up to 100% deferment within 5 years
9. Exemption from all taxes under the National Internal Revenue Code, except income tax on a gradually diminishing percentage.	✓		✓		✓		✓		✓					

	RA 5186				RA 6135		PD 1789				EO 226			
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
10. Exemption from all export and stabilization taxes.					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C. TAX CREDITS														
11. Tax credit equivalent to 100% of the value of compensating tax and custom duties that would have been paid on machinery, equipment and spare parts (purchased from a domestic manufacturer), had these items been imported.	✓	✓	✓	✓	✓	✓	✓ (Within 7 years (another tax credit equivalent to 50% thereof shall be given to the manufacturer of capital equipment)	✓	✓	✓	✓ (Within (full credit)	✓	✓ (5 (100 % credit but repayable)	✓ (years (50 years credit but repayable)
12. Tax withheld on interest payments on foreign loans provided such credit is not enjoyed by lender-remittee in his country and registered enterprise has assumed liability for tax payment.	✓	✓	✓	✓			✓	✓	✓	✓	✓ (within	✓	5	years)

	RA 5186				RA 6135		PD 1787				EO 226			
	Export		Non-Export		Export		Export		Non-Export		Export		Non-Export	
	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer	Pioneer	Non-Pioneer
13. Additional incentives whenever processing or manufacturing plant is located in an area designated by BOI as necessary for proper dispersal of industry which is deficient in infrastructures, public utilities and other facilities.					✓	✓	✓ (100% of necessary and major work if any have undertaken)	✓	✓	✓				
14. Tax credit equivalent to sales, compensating and specific taxes and duties on supplies, raw materials and semi-manufactured products used in the manufacture processing or production of export products.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
15. Tax credit on net value earned.											✓ (for first 5 years) (equal to 100% of	✓ (equal to 50% of	✓ (equal to 15% of	✓ (equal to 50% of
16. Tax credit equal to [illegible]											✓ (for	✓ first	✓ 5	✓)

The impact of BOI incentives under RA 5186 and RA 6135 as amended on the rate of return, factor prices and relative factor use of registered enterprises was analyzed in Gregorio (1979). The purpose of the present study is to update the above mentioned work by quantifying and comparing the effects of the various incentives granted under PD 1789 and BP 391 on these three variables.

2.0 Methodology

The methodology that is employed in this study is drawn from the earlier work of Gregorio (1979). However, certain extensions and modifications have been introduced to take into consideration the effects of provisions in the incentive schemes adopted after RA 5186 and RA 6135 that were not tackled in the previous study. The concept of the internal rate of return is used to trace the impact of the various incentives on the profitability of firms based on the premise that profitability influences the flow of investment to particular industries/sectors. On the other hand, the concepts of user cost of capital and elasticity of substitution are used to analyze the effects of the various incentives on relative factor choice based on the postulate that firm level decisions on the hiring of factor services are determined by relative factor prices, i.e. user cost of capital and wage rates.

2.1 The Rate of Return

One of the objectives of the BOI incentives scheme is the promotion of investments in priority industrial sectors. The effect of incentives on the direction of investment can be evaluated by quantirying the impact of said incentives on some measure of profitability. Implicit in this approach are the following assumptions:

1. Entrepreneurs base their investment decisions on some measure of profitability;
2. They perceive the additional profits attributable to the incentives as such, and
3. They react to the incentives - induced increments in profits in the same manner that they would respond to changes in the level of profitability arising from variations in other economic variables, other things being equal.

It should be noted that fiscal incentives will not necessarily alter the aggregate level of investment, which is the case when domestic savings imposes a constraint on the amount of resources that can be invested; but there is some evidence that incentives will influence investments to flow into the sectors which are favored by said incentives (Shah & Toye 1978, Hooley & Sicat 1967).

The impact of any given incentive on profitability can be measured in several ways:

1. one may compute the increase in the internal rate of return of the investment resulting from the application of the incentive given specific assumptions on the initial investment cost, the timing and the magnitude of the benefits and the costs involved;

2. one may compute the incentive induced increase in the project's net present value given specific assumptions with regards to the discount rate, the investment cost, the timing and the magnitude of the benefits and costs involved; and

3. for a given internal rate of return and a given level initial investment cost, one may compute for the change in the before-tax net revenue (or profit) stream arising from the availment of the incentive.

The third procedure is followed in the ensuing analysis. Thus, if the firm does not avail of any incentive, the familiar formula for the internal rate of return may be considered:

(1a)

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^{j}} - q = 0$$

where q is the initial investment outlay or the acquisition cost of capital inclusive of taxes and duties.

u is the corporate income tax rate,

x is the constant annual pre-tax profit stream without the incentive,

i is the internal rate of return, and

n is the life span of the capital asset.

Given the tax and tariff system in the Philippines, the relation between q and y, the acquisition cost of capital exclusive of duties and taxes is given by:

$$q = (1 + tc)(1 + td)\, y$$

where tc is the compensating tax rate on capital goods and td is the tariff rate on capital goods.

Thus, we may alternatively write equation (1a) as follows:

(1b)

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} - (1+tc)(1+td)y = 0$$

Our procedure is to solve for x as a function of q (or y) for assigned values of n and i from equation 1. Next, we compute for the value of x , i.e. the constant annual pre-tax profit stream if incentive k is availed of, for the same assigned values of n and i from variants of equation 1 so modified as to describe the situation when incentive k is operational. A comparison of these two values would then provide some measure of the impact of incentive k on the enterprise's/project's profitability.

The modifications made on the basic internal rate of return formula as various incentives are introduced will be described in the following section when individual incentives are analyzed one at a time.

2.2 Relative Factor Prices and Relative Factor Use

Another objective of the BOI program is to generate employment. In order to assess the influence of various incentives on employment, we first evaluate the effect of a given incentive on factor prices, i.e., user cost of capital, c, and the wage rate, w. We then translate these changes in c and w into

changes in the labor-capital ratio via the concept of the elasticity of substitution.

The elasticity of substitution, σ, is defined as the ratio of the percentage change in the capital-labor ratio to the percentage change in the wage-cost of capital ratio. Of course, if the elasticity of substitution were zero, i.e. if factor proportions were fixed within any given sector, then any change in c or w will have no effect on employment. Quite a large number of studies, both on the micro and the macro level, have been carried out to obtain empirical estimates of the elasticity of substitution. In the macro studies, these estimates range from .4 to 1.5 (Berndt 1962, Clague 1969, Sicat 1968, Williamson 1971). Estimates from cross-section studies are generally higher than those from time-series data. Also, short-term estimates tend to be lower than long-term estimates. On the other hand, the micro studies show that substitution possibilities between capital and labor exist in peripherical activities like handling of raw materials and semi-finished goods, packaging and storage. Thus, the results of both types of studies would seem to indicate that there are opportunities for labor-capital substitution in developing countries.

By definition, the elasticity of substitution, σ, is

$$\sigma = \frac{\frac{d(K/L)}{(K/L)}}{\frac{d(W/C)}{W/C}} \tag{2}$$

where K is investment,

L is labor,

W is wage rate, and

C is user cost of capital

If the wage rate is held constant, (2) reduces to

$$\sigma = \frac{d(K/L)(K/L)}{-d\ c/c} \tag{3a}$$

or

$$\frac{d(L/K)}{(L/K)} = \sigma\ (d\ c/c) \tag{3b}$$

On the other hand, if the user cost of capital is held constant, 2 becomes

$$\sigma = \frac{d(K/L)/(K/L)}{d\ w/w} \tag{4a}$$

or

$$d(K/L)/(K/L) = \sigma d\ w/w \tag{4b}$$

Expressions (3) and (4) can be used to measure the impact of changes in w or c, brought about by selected incentives, on the capital-labor ratio.

The approach outlined in the preceding paragraphs implicitly assumes that employment or demand for labor is a function of relative factor prices and that an increase in either the cost of capital or the wage rate affects employment by the same magnitude but in the opposite direction given the level of the capital stock. However, this approach captures only the substitution effect of the incentives program on employment, i.e. direct employment effect. It should be borne in mind that the incentive program might have a scale of effect on employment in the sense that the demand for labor is increased to complement an incentive induced increase in the level of capital in a priority sector that is more labor intensive than alternative sectors.

The concept of the user cost of capital and its relationship to tax policy parameters is well defined within the neoclassical theory of capital accumulation originally formulated by Jorgenson (1963) which assumes that firms maximize the net present value of net revenue after tax. Here, the user cost of capital or

the implicit rental of one unit of capital service per unit of time is defined in the following equation:

$$c = \frac{q(r+d)(1-ku-uz)}{(1-u)} \qquad (5)$$

where r is the rate of interest,

d is the rate of replacement of capital stock,

k is the proportion of investment expenditures permitted as additional deduction from taxable income,

z is the discounted value of the stream of depreciation charges generated by a peso of investment,

q is the price of capital goods, and

u is the corporate income tax rate.

To trace the effect of any given incentive on c, we first determine which of the variables on the right hand side of (5) is affected by the said incentive and then we differentiate (5) with respect to the explanatory variable in question. This is done in some detail in the following section.

3.0 Analysis

In this section, the various incentives extended by the BOI under PD 1789 and BP 391 are analyzed and compared in terms of their effects on the rate of return, factor prices and relative factor use of any given BOI registered firm.

3.1 Accelerated Depreciation (PD 1789)

The accelerated depreciation provision under PD 1789 enabled registered firms to depreciate fixed assets to a limit of not more than twice as fast the normal rate if expected life is ten years or less. If expected life is more than ten years, fixed assets may be depreciated over any number of years between five years and expected life. Speeding up depreciation means that deductions from tax purposes may be taken at an earlier date than before. Thus, accelerated depreciation enables the taxpayer to hold on to and to use funds that would otherwise be turned over to the government as taxes. As a consequence, the rate of return will generally be raised. It should be clear that no tax benefit will arise unless the taxpayer will eventually have sufficient income against which he can offset the deduction. That he has such an income will generally be assumed.

Following the procedure outlined in 2.1, the effect of the accelerated depreciation provision on the rate of return will now be evaluated. The variant of equation (1) which is applicable when accelerated depreciation is allowed, say h times as fast as the normal rate, is:

(6)

$$\sum_{j=1}^{n/h} \frac{(1-u)x + u(hq/n-q/n)}{(1+i)^j} + \sum_{j=(n/h)+1}^{n} \frac{(1-u)x - u(q/n)}{(1+i)^j} - q = 0$$

Table 1 summarizes the results obtained when (1) and (6) is solved for the annual pre-tax profit (as a function of the investment cost exclusive of duties and taxes, y) that is needed if the investment project is to yield various rates of return under different assumptions on the length of life of the asset, n (alternatively, 10 and 20 years). It is assumed here that both the accounting and the actual depreciation of capital equipment proceeds in a linear fashion.

For n = 10 years, the reduction in the required annual before-tax profit due to accelerated depreciation varies from 4.9 per cent to 6.6 per cent as the rate of return is varied from 8 per cent to 18 per cent. For n = 20 years, if asset is depreciated four times as fast

as the actual rate, the decline in the annual pre-tax profit necessary to yield various rates of return ranges from 11.6 to 14.1 per cent.

Table 2 indicates that the rate of return of a project with a ten-year life span will increase by an average of 1.5 percentage points while that of a project with a twenty-year life span will rise by an average of 2.1 percentage points.

To trace the effect of the accelerated depreciation provision on the user cost of capital, equation (5) is defferentiated with respect to z:

$$\Delta c = \frac{(r+d)qu}{(1-u)} \Delta z \qquad (7)$$

Without the accelerated depreciation provision z, the present value of the stream of depreciation charges, would be

$$z_o = \sum_{j=1}^{n} 1/n \left(\frac{1}{1+r}\right)^j$$

Depreciating h times as fast, z_1 would be

$$z_1 = \sum_{j=1}^{n/h} h/n \left(\frac{1}{1+r}\right)^i ,$$

Table 2

Accelerated Depreciation and the Rate of Return, PD 1789 [a/]

Specified Rate of Return	Annual Before-Tax Profit, as a Proportion of Capital Cost, Exclusive of Duties and Taxes, y, Required to Yield the Specified Rate of Return			
	n = 10		n = 20	
	Without the Incentive	With the Incentive	Without the Incentive	With the Incentive [b/]
8%	.324y	.309y	.221y	.198y
10%	.354y	.335y	.255y	.225y
12%	.384y	.363y	.289y	.254y
14%	.416y	.392y	.328y	.286y
15%	.433y	.407y	.346y	.303y
16%	.449y	.422y	.366y	.320y
18%	.483y	.453y	.405y	.355y
Δ in ROR from an original of 10% (in percentage points)		1.35		2.0

a/ Assumes u = .35, tc = .1, td = .28, i.e. q = 1.41y

b/ Asset is depreciated at the maximum allowable rate; i.e. asset is depreciated evenly over 5 years.

$(z_1 - z_0)$ is the change in z arising from the accelerated depreciation incentive.

Table 3 summarizes the impact on the user cost of capital of accelerated depreciation. We observe that accelerated depreciation reduces the user cost of capital by as much as 14 per cent for an asset with a 20 year life span.

Using equation (3b), the impact of this incentive on labor per unit of capital, (L/K) can be measured. Table 4 gives the results obtained when σ is varied from .5 to 1.5 and the same parameter values for the other variables in Table 3 are employed.

3.2 Tax Exemption/Reduction on Imported Capital Equipment (PD 1789 and BP 391)

PD 1789 granted that within seven years from the date of registration, a non-pioneer enterprise may enjoy a fifty percent reduction in the tariff duty and compensating tax on machinery and capital equipment while a pioneer enterprise is fully exempt from such taxes. Exemption from (or a reduction of) import duty and compensating tax on imported capital equipment reduces the initial cost requirement of any given investment project. Consequently, the rate of return on investment is pushed upwards.

Table 3

Accelerated Depreciation and the User Cost of Capital, PD 1789 [a/]

	n = 20			n = 10	
	Depreciating over			Depreciating over	
	5 yrs.	10 yrs.	20 yrs.	5 years	10 years
z	.670	.502	.313	.670	.502
c	-.04q	-.02q	0	-.023q	0
c/c	-.141	-.074	0	-.072	0

a/ Assumes u = .35, k = 0, r = .15 (for project evaluation purposes, an opportunity cost of capital of .15 is used by the National Economic and Development Authority (NEDA).

Table 4

Accelerated Depreciation and the Labor Capital Ratio, P.D. 1789

Depreciating in years	$\Delta (L/K) / (L/K)$					
	$\sigma = .5$		$\sigma = 1.0$		$\sigma = 1.5$	
	n=20	n=10	n=20	n=10	n=20	n=10
5	-.070	-.036	-.141	-.072	-.211	-.108
10	-.037	0	-.074	0	-.110	0

On the other hand, while BP 391, provides full exemption of duties and taxes on imported capital equipment for export producers, it only allows domestic producers a deferment in the payment of the same to the extent of 50 and 100 percent for non pioneer and pioneer enterprises, respectively, within five (5) years from date of registration. Repayment of the waived taxes are due in equal installments in the first five (5) years of operation.

To analyze the impact of this incentive on profitability we look at variants of (1). The equivalent of (1) when there is a full exemption from duties and compensating tax on imported capital equipment is:

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} - y = 0 \qquad (8)$$

On the other hand, the variant of (1) that applies when there is a 50 per cent reduction in duties and taxes on capital equipment is:

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} - \left(1 + \frac{tc}{2}\right)\left(1 + \frac{td}{2}\right) y = 0 \qquad (9)$$

With deferment to the extent of 100 per cent of taxes and duties on capital equipment, (1) becomes:

(10)

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} - y - \sum_{j=1}^{5} \frac{[(1+tc)(1+td)-1]\,y}{5(1+i)^j} = 0 \quad .$$

With deferment to the extent of 50 per cent of taxes and duties on capital equipment, (1) becomes:

(11)

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} - y - \sum_{j=1}^{5} \frac{[(1+tc/2)(1+td/2)-1]\,y}{5(1+i)^j} = 0 \quad .$$

Table 5 presents the annual pre-tax profit, as a fraction of the acquisition cost of capital exclusive of taxes and duties, y, that is required if the project is to yield specified rates of return with and without this incentive as provided under PD 1789. This reveals that the rate of return goes up by nine (9) percentage points and by more than 5.5 percentage points, for projects with ten and twenty-year life spans, respectively, as a result of the full exemption on taxes and duties on capital equipment. With the 50 percent reduction on taxes and duties on capital equipment, the rate of return is increased by approximately 4 and 2.5 percentage points respectively for n = 10 and 20 years.

Table 5

Reduction/Exemption of Import Duty and Taxes on Imported Capital and the Rate of Return, PD 1789[a/]

Rate of Return	Annual Pre-tax Profit as a Proportion of Capital Cost Exclusive of Taxes, y, Required to Yield Specified Rate of Return					
	n = 10			n = 20		
	Without the Incentive	50% Reduction	Full Exemption	Without the Incentive	50% Reduction	Full Exemption
8%	.324y	.275y	.229y	.221y	.188y	.157y
10%	.354y	.300y	.250y	.255y	.217y	.181y
12%	.384y	.326y	.272y	.291y	.247y	.206y
14%	.416y	.354y	.289y	.328y	.278y	.232y
15%	.433y	.368y	.307y	.346y	.295y	.246y
16%	.449y	.382y	.318y	.366y	.312y	.259y
18%	.483y	.410y	.342y	.405y	.345y	.287y
Δ in ROR from an original of 10% (in percentage points)		4.0	9.0		2.5	5.7

a/ Assumes d = .5, n = .1, td = .28.

Table 6 shows the estimates of the annual pre-tax profit as a proportion of the cost of capital equipment before duties and taxes for specified rates of return under deferment/exemption provision of BP 391. This incentive implies an increase of 6.8 percentage points and 4.3 percentage points in the rate of return for export projects with asset life of 10 and 20 years respectively, i.e. projects eligible for full exemption. The rate of return of non export non pioneer enterprises goes up by 1.2 percentage points if n = 10 (.7 percentage point if n = 20) while that of non-export pioneer enterprises rises by 1.8 percentage points if n = 10 (1.1 percentage points if n = 20).

In order to study the effect of the tax reduction/exemption on imported capital equipment, we differentiate (5) with respect to q:

$$\Delta c = \frac{(r+d)(1-kw-uz)\ q}{(1-u)} \qquad (12)$$

We note that $\Delta c/c = q/q$. (13)

Now, with full exemption from taxes and duties on imported capital,

$$\Delta q = y - (1+tc)(1+td)\ y \qquad (14)$$

Table 6

Exemption/Deferment of Duties and Taxes on Imported Capital Equipment and the Rate of Return, BP 391 [a/]

Specified Rate of Return	Annual Pre-Tax Profit as a Fraction of Acquisition & Taxes, y, for specified Rate of Return				Cost of Capital Exclusive of Duties			
	n = 10				n = 20			
	Without Incentive	50% Deferment	100% Deferment	Full Exemption	Without Incentive	50% Deferment	100% Deferment	Full Exemption
8%	.301y	.291y	.286y	.229y	.205y	.199y	.195y	.157y
10%	.328y	.316y	.309y	.250y	.237y	.228y	.223y	.181y
12%	.356y	.342y	.333y	.272y	.270y	.259y	.252y	.206y
14%	.386y	.370y	.358y	.295y	.305y	.291y	.282y	.232y
15%	.402y	.383y	.370y	.307y	.322y	.307y	.297y	.246y
16%	.417y	.397y	.383y	.318y	.340y	.324y	.312y	.259y
18%	.449y	.426v	.409v	.342y	.376y	.357y	.343y	.287y
Δ in ROR from an original of 10% (in percentage points)		0.9	1.6	6.8		0.6	1.0	4.3

a/ Assumes tc = .10, td = .19, u = .35

This implies that

$$\frac{\Delta q}{q} = \frac{1}{(1+tc)(1+td)} - 1 \quad , \tag{15}$$

With the 50 percent reduction of taxes and duties on capital equipment,

$$\Delta q = (1+tc/2)(1+td/2)y - (1+tc)(1+td)y \tag{16}$$

which again implies that

$$\frac{\Delta q}{q} = \frac{(1+tc/2)(1+td/2)}{(1+tc)(1+td)} - 1 \quad , \tag{17}$$

With deferment in the payment of taxes and duties on capital equipment,

$$\Delta q = y + y \sum_{j=1}^{5} \frac{(1+tc/p)(1+td/p) - 1}{5(1+i)^{j}} - (1+tc)(1+td)y \tag{18}$$

and

$$\frac{\Delta q}{q} = \frac{1 + \sum_{j=1}^{5} \frac{(1+tc/p)(1+td/p) - 1}{5(1+i)^{j}}}{(1+tc)(1+td)} - 1 \tag{19}$$

where p is equal to 1 in case of 100 per cent deferment and p is equal to 2 in case of 50 per cent deferment.

In the period when PD 1789 was in effect, tc = .1 and td = .28. This implies that the user cost of capital is reduced by 15.1 per cent with the 50 per cent reduction in duties and taxes on imported capital equipment while with full exemption, it declines by 29 per cent.

The implementation of BP 391 coincided with the tariff reform program such that tc = .1 and td = .19 at present. These parameters suggest that with full exemption from duties and taxes on capital equipment the user cost of capital is reduced by 23.7 per cent. With 50 per cent deferment and assuming that r = .15, then the user cost of capital is reduced by 7.8 per cent while with 100 per cent deferment, it goes down by 16 per cent.

The impact of this provision on the labor capital ratio is presented in Table 7 for varying values of the elasticity of substitution. Under PD 1789, the labor-capital ratio would decline anywhere from 7.5 to 43.5 per cent given the parameter assumptions of this paper. BP 391, on the other hand, reduces the labor-capital ratio by 3.9 to 35.5 per cent.

Table 7

Reduction/Deferment/Exemption From Taxes and Duties On Imported Capital Equipment and the Labor Capital Ratio, PD 1789 and BP 391 (In Per cent)

	Δ c/c	Δ (L/K) / (L/K)		
		σ = .5	σ = 1.0	σ = 1.5
PD 1789				
50% Reduction	-15.1	-7.5	-15.1	-22.6
100% Reduction	-29.0	-14.5	-29.0	-43.5
BP 391				
50% Deferment	-7.8	-3.9	-7.8	-11.7
100% Deferment	-16.0	-8.0	-16.0	-24.0
100% Exemption	-23.7	-11.8	-23.7	-35.5

3.3 Tax Credit for Domestic Capital Equipment (PD 1789 and BP 391)

PD 1789 entitled a registered enterprise that purchases machinery, equipment and spare parts from domestic manufacturer within seven years from date of registration to a tax credit equivalent to 100 per cent of the value of tariff and taxes that would have been paid had these items been imported. PD 1789 also provided that the domestic manufacturer of capital equipment gets a tax credit equivalent to 50 per cent of the tax credit given to the registered enterprise.

BP 391 grants to registered domestic producers purchasing domestically manufactured capital equipment within 5 years from date of registration a tax credit equal to the taxes and duties that would have been waived had the same been imported. This tax credit has to be repaid in equal installments in first five years of the enterprise's commercial operation. Export producers, however, are entitled to a non-repayable tax credit on the purchased of locally manufactured capital equipment.

The analysis as well as the estimates of the impact of this provision on the rate of return, user cost of capital, and labor-capital ratio are identical to that of the reduction/exemption/deferment or tariff and taxes on imported capital as presented in 3.2.

3.4 Expansion Reinvestment Allowance (PD 1789)

The expansion reinvestment provision of PD 1789 allowed registered firms to deduct from their taxable income a certain proportion, k, (.25, .375 or .5 for non-pioneer projects and .50, .75 or 1.0 for pioneer projects) of the amount of undistributed profits transferred to their capital account for procurement of machinery, equipment and other expansion.

With the expansion reinvestment allowance, the relevant version of the rate of return formula for the expansion portion of the project is:

(20)

$$\sum_{j=1}^{n} \frac{(1-u)x}{(1+i)^j} + \frac{u\,k\,q}{(1+i)} - q = 0 \quad .$$

Table 8 presents the annual pre-tax profit as a fraction of the acquisition of capital inclusive of duties and taxes, q, required to yield specified rates of return for the expansion project based on the assumption that the expansion project is fully financed by undistributed profits. Depending on the value of k, the rate of return goes up by 1.9 to 8.9 percentage points if n = 10 by 1.2 to 6.0 percentage points if n = 20.

Table 8

EXPANSION INVESTMENT ALLOWANCE AND THE RATE OF RETURN, PD 1789 [a/]

Rate of Return	Annual Before-Tax Profit as a Percentage of Capital Cost Inclusive of Taxes & Duties, q, Required to Yield Specified Rates of Return											
	n = 10						n = 20					
	Without Incentive	With the Incentive					Without Incentive	With the Incentive				
		k= 25	k= 375	k= 5	k= 75	k=1 0		k= 25	k= 375	k = 5	k= 75	k=1 0
8%	229q	211q	201q	192q	174q	155q	157q	144q	138q	131q	119q	106q
10%	250q	230q	221q	211q	191q	171q	181q	166q	159q	152q	138q	123q
12%	272q	251q	240q	230q	206q	187q	206q	190q	182q	174q	158q	142q
14%	295q	272q	261q	250q	227q	204q	232q	214q	206q	197q	179q	161q
15%	307q	283q	272q	260q	237q	213q	246q	227q	218q	208q	190q	171q
16%	318q	294q	282q	270q	246q	222q	259q	240q	230q	220q	201q	181q
18%	342q	317q	304q	292q	266q	241q	287q	266q	255q	245q	223q	202q
Δ in ROR from an original of 10% (in percentage points)		1 9	2 9	4 0	6 5	8 9		1 2	2 0	2 6	4 1	6 0

To trace the effect of this incentive on the user cost of capital, we differentiate (5) with respect to k to obtain:

$$\Delta c = \frac{qu(r+d)}{(1-u)} \Delta k \qquad (21)$$

Without the expansion reinvestment clause, k = 0; with this incentive k ranges from .25, and 1.0 depending on the status of the registered firm. Table 9 provides a summary of the effect on the user cost of capital of the tax incentive on expansion reinvestment. The same assumption on the value of u, d and r as in 3.1 are used.

The impact of this incentive on the labor-capital ratio is presented in Table 10.

3.5 Tax Credit for Withholding Tax on Interest (PD 1789 and BP 391)

Under PD 1789, a registered firm was entitled to a tax credit for taxes withheld on interest payments on foreign loans provided that the lender enjoys no such credit in his own country and that the registered firm has assumed the liability for the payment of the tax dues from the lender. This provision affects the

Table 9

Expansion Reinvestment Allowance and the User Cost of Capital

	k = .25	k = .375	k = .5	k = .75	k = 1.0
n = 20					
Δc	-.027q	-.040q	-.054q	-.081q	-.108q
$\Delta c/c$	-.098	-.147	-.197	-.295	-.393
n = 10					
Δc	-.034q	-.050q	-.067q	-.101q	-.135q
$\Delta c/c$	-.106	-.159	-.212	-.318	-.425

Table 10

Expansion Reinvestment Allowance and the Labor Capital Ratio

K	Δ (L/K) / (L/K)					
	σ = .5		σ = 1.0		σ = 1.5	
	n = 10	n = 20	n = 10	n = 20	n = 10	n = 2
.25	-.053	-.049	-.106	-.098	-.159	-.147
.375	-.080	-.073	-.159	-.147	-.239	-.220
.5	-.106	-.098	-.212	-.197	-.303	-.295
.75	-.159	-.147	-.318	-.295	-.477	-.443
1.0	-.212	-.176	-.425	-.393	-.637	-.569

effective rate of interest at which firms borrow from abroad and consequently, the user cost of capital. BP 391 grants exactly the same incentive but limits its application to pioneer enterprises.

The National Internal Revenue Code (NIRC) provides that the withholding tax on interest on foreign loans is equivalent to 15 per cent of interest payments. At the prevailing borrowing rates on foreign loans which range from 10 to 15 per cent the withholding tax implies an additional 1.5 to 2.25 percentage points on the rate of interest.

With this incentive clause the rate of return formula may be written as follows:

$$\sum_{j=1}^{n} \frac{(1-u)(x+sq\Delta r)}{(1+i)^{j}} - q = 0 \qquad (22)$$

where Δr is the increment in the rate of interest attributable to the withholding tax on interest, and

s is the ratio of the foreign loan to the initial investment cost.

The estimates of the effect of this provision on profitability is shown in Table 11. Given the parameter values that we used, the increment in the

Table 11

Tax Credit For Witholding Tax on Interest Rates And The Rate of Return, PD 1789 and BP 391 [a]

Rate of Return	n = 10					n = 20				
	Without Incentive	Δ r = .015		Δ r = .0225		Without Incentive	Δ r = .015		Δ r = .0225	
		s = .25	s = .5	s = .25	s = .5		s = .25	s = .5	s = .25	s = .5
8%	.229q	.226q	.222q	.224q	.218q	.157q	.153q	.149q	.151q	.145q
10%	.250q	.247q	.243q	.245q	.239q	.181q	.177q	.173q	.175q	.168q
12%	.272q	.269q	.265q	.267q	.261q	.206q	.202q	.198q	.200q	.195q
14%	.295q	.291q	.287q	.289q	.282q	.232q	.229q	.225q	.227q	.221q
15%	.307q	.303q	.299q	.301q	.295q	.246q	.242q	.238q	.240q	.235q
16%	.318q	.315q	.311q	.313q	.307q	.259q	.256q	.252q	.254q	.248q
18%	.342q	.339q	.335q	.337q	.331q	.287q	.284q	.280q	.282q	.276q
Δin ROR from an original of 10% (in percentage points)		.3	.6	.4	1.0		.3	.6	.5	1.0

a/ Assumes

rate of return due to this incentive ranges from .3 to 1.0 percentage points.

Differentiating (5) with respect to r, we see the effect of this incentive on the user cost of capital:

$$\Delta c = \frac{(1-ku-uz\,\Delta r)}{(1-u)} \qquad (23)$$

Without the incentive, the effective rate of interest, r is equal to the nominal rate times 1.15. With this incentive, the rate of interest, r is simply the nominal rate.

Table 12 shows the results of the simulations done on the user cost of capital as the rate of interest is varied while Table 13 give the picture of the effect on the labor-capital ratio. The results indicate that the user cost of capital is reduced by 7 to 8.3 per cent due to the incentive under investigation. This implies that for = 1.0, labor per unit of capital will decline by as much as 8.3 per cent.

This incentive has a built-in bias in favor of foreign loans. This bias comes from two sources: (1) a tax credit for taxes paid on interest payments on

Table 12

User Cost of Capital and Tax Credit for Withholding Tax On Interest on Foreign Loans

	Δc		Δc		c/c	
	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10
r_0 = .115	-.020q	-.018q	.217q	.264q	-.091	-.070
r_1 = .10						
r_0 = .14	-.027q	-.025q	-.274q	.317q	-.100	-.080
r_1 = .13						
r_0 = .1725	-.031q	-.029q	.309q	.352q	-.101	-.083
r_1 = .15						

Table 13

Tax Credit For Withholding Tax on Interest on Foreign Loans And Labor-Capital Ratio

	$\Delta (L/K) / (L/K)$		
	$q = .5$	$q = 1.0$	$q = 1.5$
$r_0 = .115$	-.035	-.070	-.105
$r_1 = .10$			
$r_0 = .15$	-.040	-.080	-.120
$r_1 = .13$			
$r_0 = .1725$	-.041	-.083	-.124
$r_1 = .15$			

foreign loans is allowed for registered firms while none is applicable to interest payments on domestic loans; (2) the tax on interest payments on foreign loans is lower than that on domestic loans regardless of the status of the enterprise concerned.

3.6 Deduction of Direct Labor Cost and Cost of Local Raw Materials (PD 1789)

Registered firms were entitled under PD 1789 for the first five years from the date of registration, to deduct from their taxable income an amount equivalent to the sum of direct labor cost and cost of local raw materials used in the manufacture of their export product provided that such a deduction does not exceed 25 per cent of total export revenue.

To simplify the analysis, assume for the moment that firm is engaged only in export activities and that the 25 per cent of export revenue ceiling on the amount of allowable additional deductions does not exist. If the sum of direct labor cost, L and local raw material cost, D is equal to pre-tax profit, (R-D-L-M-O), then the additional tax deduction is just equal to the taxable income without the incentive.[1/] Thus, if the

---

1/ R is receipts from export sales, M is the cost of imported inputs and O is other costs.

incentive is availed of, tax liability would be zero and after-tax profit will be raised by an amount u(R-D-L-M-O). The proportional rate of increase in after-tax profit due to the incentive is given as

$$\frac{u(R - D - L - M - O)}{(1 - u)(R-D-L-M-O)} = \frac{u}{1-u} = .538$$

This is the maximum possible increase in profits in the year the incentive is claimed, obtainable by increasing the use of local inputs and labor. Beyond this point, the additional tax deduction would exceed the taxable income and no further incremental increase in profits would be forthcoming even if more local inputs and labor were used.

In this case, since it is known that profits in the year the incentive is claimed is increased by some proportion, say A, and that this incentive can be claimed in the first five years from date of registration, the variant of (1) which is relevant is

$$\sum_{j=1}^{5} \frac{(1-u)(1+A)x}{(1+i)^j} + \sum_{j=5}^{n} \frac{(1-u)x}{(1+i)^j} - q = 0 \qquad (24)$$

Using (24), if it is assumed that n = 10 and that the rate of return before the incentive is claimed is 10

per cent, it can be shown that the rate of return will increase by 8 percentage points at the maximum if this incentive is availed of (see Table 14) .

On the other hand, if the sum of direct labor cost and local raw material cost is less than pre-tax profits then the additional deduction is less than the taxable income without the incentive. Thus, if the incentive is claimed, tax liability will be decreased by an amount u(D + L) and subsequently, after tax profit will be increased by the same amount. The proportional rate of increase in after-tax profit will be equal to

$$\frac{u(D+L)}{(1-u)(R-D-L-M-O)} < \frac{u}{1-u}$$

The implication is that it pays to increase the use of local raw materials and labor as long as (D + L) < (R-D-L-M-O).

Now, recall that the additional tax deduction for labor and local raw materials costs cannot exceed 25 per cent of export revenue. Thus, the limitations on the incentive to increase profits via increasing the use of domestic raw materials and labor come from two directions: (1) the sum of direct labor and domestic

Table 14

Deduction of Direct Labor Cost and Local Raw Materials and The Rate of Return, PD 1789[a/]

Rate of Return	Annual Before Tax Profit as a Percentage of Capital Costs Inclusive of Taxes and Duties, q, Required to Yield Specified Rate of Return			
	Without the Incentive	With the Incentive	Without the Incentive	With the Incentive
8%	.229q	.174q	.157q	.129q
10%	.250q	.188q	.181q	.146q
12%	.272q	.203q	.206q	.164q
14%	.295q	.218q	.233q	.182q
15%	.307q	.226q	.246q	.191q
16%	.318q	.233q	.259q	.200q
18%	.342q	.249q	.287q	.219q
Gain ROR from original of 10% (in percentage points)		8.0		4.0

[a/] Assumes c = .35, k = 54 per cent

raw material costs relative to taxable income and (2) the 25 per cent of export sales ceiling on allowable additional deduction. In other words, profits can be raised by increasing locally produced inputs and labor up to the point where the lower of these constraints is reached.

At this point, consider a firm that is engaged in both export and domestic activities. If $(D + L) < R-D-L-M-O)$, $(D + L) < .25X$, then the proportional rate of increase in total profits is given by

$$\frac{u(D+L)}{(1-u)\ (R-X-D-L-M-O)}$$

In view of this, it becomes apparent that the incentive to increase the utilization of domestic raw materials and labor is enhance by the presence of profits gained from the domestic activity. This is so because a larger deduction (within the 25 per cent ceiling) can be absorbed by the larger profit. Also, it should be pointed out that the higher the proportion of export sales to total sales the more likely it is for the first limitation mentioned above to be the more binding constraint.

Now let us focus our attention on the possible effects of this provision on employment generation. If it is assumed that all of the raw material inputs are imported then the direct labor wage bill is decreased by an amount equal to (.25) (.35)x = .0875X at the maximum and by at most 35 per cent in terms of proportional changes in the year the incentive is claimed. It should be recalled that this incentive can be availed of only in the first five (5) years from the date of registration. As such, this reduction in the direct labor wage bill in the year the incentive is claimed can be expressed in terms of an equivalent reduction in direct labor cost throughout the duration of the whole project.[2/] If the rate of interest is assumed to be 15 per cent and if the direct labor wage bill is assumed to remain constant throughout the life of the project, this 35 per cent reduction (at the maximum) in the direct labor cost in the years the incentive is claimed, i.e., the first five (5) years from the date of registration, is equivalent to 18.4

2/ To do this, we solve for the percentage reduction in the direct labor wage bill effective for the whole duration of the project such that the present value of the cost flow appropriate to this situation is equal to the present value of the cost flow when there is a 35 per cent reduction in the direct labor wage bill for the first five years of operation only.

per cent (23.4 per cent) reduction in the same throughout the duration of a 20 year (10 year) project. As the share of local raw materials inputs rises the share of labor in the subsidy decreases. At any rate, as discussed above, firms do get a subsidy for selecting projects and techniques that use more labor and local raw materials. And, in general, labor per unit of capital rises by 9.2 to 27.6 per cent at the maximum as the elasticity of substitution varies from .5 to 1.5 per cent for a 20 year project.

However, this provision may have very little effect in increasing the attractiveness of using more labor. First, the incentive applies only to export production. It does not affect the relative cost of labor facing firms producing for the domestic market. Second, there exists the possibility that firms using local raw materials more intensively are also more capital intensive. For instance, copper smelting is intensive in the use of both capital and local raw materials while electronics manufacture may be both labor-and-imported-raw-materials-intensive. Third, since the duration of the incentive is short, i.e., the first five (5) years of operations only then the incentive to increase the use of local raw materials compared to the incentive to increase the use of labor

is greater. This is so because, given the production technique chosen at the beginning of operations, it is easier to substitute imported for locally produced inputs than to substitute other inputs for labor after the incentive period has lapsed. Fourth, it may be the case that the share of the two inputs in question in relation to export exceeds the 25 per cent ceiling. If this occurs then the provision becomes a straight subsidy to export sales whose actual value to the individual firm varies with its export profit margin regardless of whether or not additional labor and local inputs are actually used. This implies that only firms with export profit margins of at least 25 per cent can take full advantage of the deduction. This points up the anomally of deducting certain costs up to a limit that is related to some other factors. Rather there should be a tax credit equivalent to a fixed percentage of the costs.

The last point raised above leads us to consider a more general problem. Incentives are effective only at the margin of choice. However, there always exist intra-marginal firms that would have, for example, used more than 25 per cent of sales in local inputs even if no incentive is given. These firms are, therefore, earning economic rents. For this reason, some have

argued that the government should discriminate by setting incentives for each firm or sector on a case to case basis, instead of granting incentives that apply uniformly across all firms, so as to maximize response per unit of tax revenue lost.

To summarize, three things are mixed up in this provision: (1) subsidizing exports, (2) subsidizing employment and (3) subsidizing the use of domestic raw materials. The first should be subsidized so as just to offset the underevaluation of foreign exchange that protection depends. The second should be subsidized on the basis of the shadow price or the social value of labor. The third should be subsidized so as to match the drawback on comparable imported inputs. These are independent and addable reasons for subsidies. Hence the three should be separated.

3.7 Exemption From All National Internal Revenue Except Income Tax (PD 1789)

PD 1789 granted pioneer enterprises exemption from all taxes under the NIRC except income tax to the extent of 100 per cent for the first five years, 75 per cent for the sixth through the eight years, 50 per cent for the ninth and tenth years, 20 per cent for the eleventh and twelfth years and 10 per cent for the thirteenth to the fifteenth year.

The most important of the NIRC taxes from which the pioneer firm was exempted under this incentive proviso is the sales tax. If we express sales as some proportion , f, of annual pre-tax profit, x, we can write the rate of return formula as follows:

$$\sum_{j=1}^{5} \frac{(1-u)(x+g_j\ ts\ f\ x)}{(1+i)^j} - q = 0 \qquad (25)$$

where g_j is the extent of exemption in year j, and

ts is the sales tax rate.

We observe that for a reasonable range of f, the impact of this incentive on the rate of return ranges from 3.0 to 7.7 percentage points if n = 10, and from 1.4 to 4.0 percentage points if n = 10 (see Table 15)

This incentive is neutral with respect to factor prices and consequently, factor choice.

3.8 Tax Credit for Net Value Earned (BP 391)

BP 391 accords non pioneer (pioneer) enterprises a tax credit equivalent to 5 per cent (10 per cent) of net value earned for five years from the start of commercial operation. Net value earned is defined as

Table 15

Exemption from All NIRC Taxes Except Income Tax and Rate of Return, PD 1789[a/]

Rate of Return	Annual Pre-Tax Profit as a Proportion of Capital Cost Inclusive of Taxes and Duties, q, for Specified Rate of Return							
	n = 10				n = 20			
	Without Incentive	With Incentive			Without Incentive	With Incentive		
		f = 1.5	f = 2.5	f = 4.0		f = 1.5	f = 2.5	f = 4.0
8%	.229q	.2030q	.1886q	.1704q	.157q	.1434q	.1358q	.1257q
10%	.250q	.2214q	.2056q	.1857q	.181q	.1646q	.1553q	.1432q
12%	.272q	.2406q	.2233q	.2014q	.206q	.1867q	.1757q	.1615q
15%	.307q	.2704q	.2507q	.2260q	.246q	.2214q	.2077q	.1900q
20%	.367q	.3230q	.2991q	.2692q	.315q	.2822q	.2635q	.2396q
Δ in ROR from an original of 10% (in percentage points)		1.0	5.0	7.7		1.4	2.5	4.0

[a/] Assumes u = .35

value of sales less cost of raw materials and components, supplies and utilities and depreciation.

To assess the effect of this provision on the rate of return we can express net value earned as some proportion, say v, of pre-tax profit, x, such that if the incentive is at 5 per cent, equation 1 becomes:

$$\sum_{j=1}^{5} \frac{(1-u)x + .05(vx)}{(1+i)^j} + \sum_{j=5} \frac{1-u)x}{(1+i)^j} - q = 0 \qquad (26)$$

Similarly, if the incentive is taken at 10 per cent we get:

$$\sum_{j=1}^{5} \frac{(1-u)x + .1(vx)}{(1+i)^j} + \sum_{j=5}^{n} \frac{(1-u)x}{(1+i)^j} - q = 0 \qquad (27)$$

An examination of the 1979 Input-Output Table reveals that v ranges from 1.25 to 3.5 for the manufacturing sector. Table 16 summarizes the impact of this incentive on the annual pre-tax profit. A non pioneer firm's rate of return increases by 1.3 - 3.9 (.7 - 1.9) percentage points while that of a pioneer firm goes up by 2.7 - 8.1 (1.4 - 3.9) percentage points if n = 10 (n=20).

Table 16

Tax Credit on Net Value Earned and the Rate of Return, BP 391 a/

Rate of Return	Annual Pre-Tax Profit as a Proportion of Capital Cost												
	n = 10							n = 20					
	Without the Incentive	With the Incentive						Without the Incentive	With the Incentive				
		v = 1.25		v = 2		v = 3.5			v = 1.25		v = 2		v = 3.5	
		5% Incentive	10% Incentive	5% Incentive	10% Incentive	5% Incentive	10% Incentive		5% Incentive	10% Incentive	5% Incentive	10% Incentive	5% Incentive	10% Incentive
8%	.225q	.217q	.206q	.210q	.194q	.198q	.174q	.157q	.151q	.145q	.147q	.139q	.141q	.128q
10%	.250q	.235q	.224q	.229q	.210q	.215q	.186q	.181q	.173q	.166q	.169q	.159q	.161q	.146q
12%	.275q	.257q	.243q	.248q	.228q	.232q	.203q	.206q	.197q	.188q	.192q	.179q	.182q	.163q
14%	.300q	.272q	.262q	.268q	.245q	.251q	.218q	.232q	.221q	.211q	.215q	.200q	.204q	.182q
15%	.307q	.288q	.272q	.278q	.254q	.260q	.225q	.246q	.234q	.223q	.227q	.211q	.215q	.191q
16%	.325q	.299q	.282q	.288q	.263q	.269q	.233q	.259q	.246q	.235q	.235q	.218q	.226q	.200q
18%	.350q	.321q	.302q	.309q	.282q	.288q	.249q	.287q	.272q	.258q	.254q	.244q	.248q	.219q
Δ in MRR from an original of 10% in percentage points)		1.3	2.7	2.2	4.5	3.9	8.1		.7	1.4	1.0	2.1	1.9	3.9

a/ Assumes d = .35

The tax credit on net value earned is neutral with respect to factor use. Furthermore, since the level of equivalent subsidy granted to firms under this incentive is dependent on the firms' economic contribution, this incentive is also cost effective.

3.9 Tax Credit on Net Local Content (BP 391)

BP 391 provides export producers a tax credit equal to 10 per cent of net local content for the first five years of commercial operation. Net local content is defined as export sales less cost of imported raw materials and components, supplies, utilities and depreciation.

If net local content is expressed as some factor, m, of before-tax profit, x , and if this incentive is taken into account, then the rate of return formula becomes:

(28)

$$\sum_{j=1}^{5} \frac{(1-u)x + .1(m\,x)}{(1+i)^j} \qquad \sum_{j=5}^{n} \frac{(1-u)x}{(1+i)^j} - q = 0$$

Given the 1979 Input-Output Table, m is seen to range in value from 2.0 to 8.0. Table 17 summarizes the effect of this provision on the rate of return.

Table 17

Tax Credit on Net Local Content and Rate of Return, BP 391 [a/]

Rate of Return	Annual Pre-Tax Profit as a Proportion of Capital Cost Inclusive of Taxes and Duties, q, for Specified Rates of Return							
	n = 10				n = 20			
	Without Incentive	With Incentive			Without Incentive	With Incentive		
		m = 2	m = 5	m = 8		m = 2	m = 5	m = 8
8%	.229q	.194q	.157q	.132q	.157q	.139q	.119q	.104q
10%	.258q	.210q	.170q	.142q	.181q	.159q	.135q	.117q
12%	.272q	.228q	.183q	.152q	.206q	.179q	.150q	.129q
14%	.295q	.245q	.196q	.162q	.232q	.200q	.166q	.142q
15%	.307q	.254q	.202q	.168q	.246q	.211q	.174q	.148q
16%	.318q	.263q	.209q	.173q	.259q	.218q	.182q	.154q
18%	.342q	.282q	.223q	.184q	.287q	.244q	.198q	.167q
Δ in ROR from original of 10% (in percentage points)		4.5	12.8	20.5		2.1	6.0	10.2

a/ Assumes q = .35

The tax credit on net local content increases the rate of return by 4.5 to 20.5 percentage points if n = 10 and by 2.1 to 10.2 percentage points if n = 20.

Like the tax credit on net values earned, this incentive clause is neutral with respect to factor use in as much as it does not affect factor prices. Since its availability to firms hinges on the firms' "true" export performance as reflected in the net local content of their exports, it is an efficient way of promoting exports.

3.10 The Total Effect on the Rate of Return, User Cost of Capital and Labor-Capital Ratio

Gregorio (1979) has shown that the various incentives when applied in combination with each other have <u>at least</u> additive effects on the rate of return and <u>exactly</u> additive effects on the user cost of capital and consequently, on the labor-capital ratio. Using her results, we will now look at the total effect of the selected incentives analyzed in the foregoing sections (when availed of simultaneously) on the rate of return, the user cost of capital and the cost of labor, and the labor-capital ratio of typical BOI registered firms.

Firms registered with the BOI may be categorized under two main groups: (1) exporting, and (2) non exporting. Firms falling under either one of these headings may further be classified as (1) pioneer or (2) non-pioneer. In addition, one may distinguish between (1) new and (2) expansion projects.

Table 18 presents the total effect of the incentive package under PD 1789 on the rate of return of "typical" BOI registered firms. A similar presentation for the incentives under BP 391 is given in Table 19. The impact on the internal rate of return of both incentive schemes is quite significant. Depending on the characteristics of the firm, PD 1789 augments the rate of return by 5.9 to 31.5 percentage points with non exporting non pioneer non expansion exporting pioneer expansion projects situated on the top part of this range. On the other hand, BP 391 adds anywhere from 3.0 to 24.7 percentage points to the registered firms' internal rate of return. If one excludes the expansion reinvestment allowance which is available to expansion projects only, then the increase in the rate of return, of the "typical" BOI exporting firms is greater under BP 391 than under PD 1789. The reverse is true of the increase in the rate of return of the "typical" BOI non exporting firms.

Table 18

PD 1789 INCENTIVES AND THE CHANGE IN RATE OF RETURN OF "TYPICAL" [illegible] a/
(in percentage points)

	Exporting								Non-Exporting							
	Non Pioneer				Pioneer				Non Pioneer				Pioneer			
	New Project n=10	New Project n=20	Expansion Project n=10	Expansion Project n=20	New Project n=10	New Project n=20	Expansion Project n=10	Expansion Project n=20	New Project n=10	New Project n=20	Expansion Project n=10	Expansion Project n=20	New Project n=10	New Project n=20	Expansion Project n=10	Expansion Project n=20
1. Accelerated Depreciation	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0
2. Exemption/ Credit for Taxes and Duties on Capital Equipment	9.0	5.7	9.0	5.7	9.0	5.7	9.0	5.7	4.0	2.5	4.0	2.5	9.0	5.7	9.0	5.7
3. Expansion Reinvestment Allowance b/	-	-	2.9	2.0	-	-	6.3	4.1	-	-	2.9	2.0	-	-	6.3	4.1
4. Double Deduction of Labor & Local Raw Materials Cost	8.0	4.0	8.0	4.0	8.0	4.0	8.0	4.0	-	-	-	-	-	-	-	-

	Exporting								Non-Exporting							
	Non Pioneer				Pioneer				Non Pioneer				Pioneer			
	New Project n=10		Expansion Project n=10		New Project n=10		Expansion Project n=10		New Project n=10		Expansion Project n=10		New Project n=10		Expansion Project n=10	
		n=20		n=20		n=20		n=20		n=20		n=20		n=20		n=20
5. Tax Credit for Withholding Tax on Interest c/	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
6. Exemption from all MIRC taxes except income tax d/	-	-	-	-	5.0	2.5	5.0	2.5	-	-	-	-	5.0	2.5	5.0	2.5
7. All Incentives	19.8	13.1	22.7	15.1	24.8	15.6	31.5	19.7	6.8	5.9	9.7	7.9	16.8	11.6	23.1	15.7

a/ The increment in the ROR is estimated assuming that the ROR without the incentive is 13%.

b/ Assumes $k = .375$ if the project is non pioneer and $k = .75$ if the project is pioneer.

c/ Assumes $\Delta r = .0225$ and $s = .25$.

d/ Assumes $f = 2.5$

Table 19

BP 391 Incentives and the Change in the Rate of Return of "Typical" BOI Registered Firms[a/]
(in percentage points)

	Exporting				Non-Exporting			
	Non Pioneer		Pioneer		Non Pioneer		Pioneer	
	n=10	n=20	n=10	n=20	n=10	n=20	n=10	n=20
1. Deferment/ Exemption/ Credit of Taxes and Duties on Capital Equipment	6.8	4.3	6.8	4.3	.9	.6	1.6	1.0
2. Tax Credit for Withholding Tax	-	-	0.4	0.4	-	-	0.4	0.4
3. Tax Credit on Net Value Earned	2.2	1.0	4.5	2.1	2.2	1.0	4.5	2.1
4. Tax Credit on Net Local Content	12.0	6.0	12.0	6.0	-	-	-	-
5. All Incentives	22.0	12.3	24.7	13.8	4.1	2.6	7.5	4.5

a/ The increment in the ROR is estimated assuming that the ROR without the incentive is 10 per cent.

b/ Assumes v = 2.

c/ Assumes h = 5.

Table 20 summarizes the total effect of PD 1789 incentives on both the user cost of capital and the labor-capital ratio of "representative" BOI firm. The total reduction in the user cost of capital and the labor capital ratio ranges from 21.1 to 82.7 per cent depending on traits of the firm. Note that under BP 391, there is only one incentive which affects factor choice, namely, the deferment/exemption of taxes and duties on capital equipment. The effect of this incentive is to reduce the labor capital ratio by 7.8 to 23.7 per cent.

4.0 Summary and Conclusions

The passage of BP 391 in April 1983 marked a turning point in the Philippine industrial incentive policy. First, it simplified the administration of the fiscal incentives program by replacing PD 1789's 14 fiscal incentives with only eight (8). Second, it withdrew most of the capital-use related incentives present in PD 1789 in favor of incentives that have a neutral effect on relative factor prices. Third, it eliminated PD 1789's propensity to grant incentives that address multiple and, at times, conflicting objectives in a circuitous manner that produces deleterious effects. This it did by introducing two (2) innovative

Table 20

Proportional Rate of Change in the PD 1782 Incentives and User Cost of Capital-Wage Rates and Labor-Capital Ratio of typical BOI Registered firms
(in per cent)

Incentives	Exporting								Non Exporting							
	Non Pioneer				Pioneer				Non Pioneer				Pioneer			
	New Project		Expansion Project		New Project		Expansion Project		New Project		Expansion Project		New Project		Expansion Project	
	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20
1. Accelerated Depreciation	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1	-7.2	-14.1
2. Reduction/ Exemption/ Credit for Taxes and Duties on Capital Equipment	-29.0	-29.0	-29.0	-29.0	-29.0	-29.0	-29.0	-29.0	-15.1	-15.1	-15.1	-15.1	-29.0	-29.0	-29.0	-29.0
3. Tax Credit on With-holding Tax on Interest	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1	-8.3	-18.1
4. Expansion Reinvestment Allowance			-15.9	-14.7			-31.8	-29.5			-15.9	-14.7			-31.8	-29.5

Incentives	Exporting								Non Exporting							
	Non Pioneer				Pioneer				Non Pioneer				Pioneer			
	New Project		Expansion Project		New Project		Expansion Project		New Project		Expansion Project		New Project		Expansion Project	
	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20	n = 10	n = 20
5. Sub-Total for Capital Cheapening Incentives 1 to 4	-44.5	-53.2	-68.4	-67.9	44.5	-53.2	-76.3	-82.7	-38.5	-39.3	-46.5	54.8	-44.5	-53.2	-76.3	-82.7
6. Double Deduction of Direct Labor Cost	23.4	18.4	23.4	18.4	23.4	18.4	23.4	18.4								
7. All Incentives	-21.1	.34.8	-37.8	-49.5	-31.1	-34.8	-52.9	-64.3	-38.6	-39.3	-46.5	-54.8	-44.5	-53.2	-76.3	-82.7

a/ Assumes r = 1.

incentives that are not only factor neutral but efficient in use of scarce government resources as well.

PD 1789 of 1981, like RA 5186 and RA 6135 which came before it, relied heavily on incentives that have a capital cheapening effect, namely, accelerated depreciation, credit/exemption/reduction of taxes and duties on capital equipment, tax credit for withholding tax on interest and expansion reinvestment allowance. The foregoing analysis indicated that the user cost of capital and, consequently, the labor-capital ratio is reduced anywhere from 30.6 to 82.7 per cent if the full package of incentives relating to capital use is availed of by a registered firm. The double deduction of direct labor and local raw material costs has the ability to counteract to some extent this bias favoring capital use by reducing the wage bill by 18.4 to 23.4 per cent per annum at the maximum. But the effectiveness in doing so of the double deduction of labor and local raw material cost is limited by the presence of so many caveats regarding its availability to registered firms, e.g. it is available to export firms only and only up to 25 per cent of export revenues, etc.

On the other hand, BP 391 completely dropped the accelerated depreciation and the expansion reinvestment provisions. At the same time it limited the availability of

the tax credit for withholding tax on interest to pioneer firms only. While exporting firms get full exemption/tax credit for taxes and duties on capital equipment, non exporting firms are only allowed to defer payment of said taxes so as to alleviate the cash flow problems associated with the payment of these taxes. All of these modifications imply that the user cost of capital of firms registered under BP 391 is reduced by only 7.8 to 23.7 per cent.

In place of the capital related incentives, BP 391 instituted the tax credit on net value earned and the tax credit on net local content. We have already pointed out in the foregoing discussion that these incentives are not only factor neutral but cost effective as well. This is because the level of equivalent subsidy, or alternatively, the cost of the incentive to the government in terms of foregone revenues, is made to depend on the realized economic contribution (value added) and/or export revenues generated of the registered firms. It should be pointed out that these two new incentives are superior to the only factor neutral incentive available under PD 1789, i.e. tax holiday from all NIRC taxes except income tax, in the sense that the base of tax credit provisions is economic contribution while that of the tax holiday is sales.

Finally, we note that the impact of the package of incentives under both PD 1789 and BP 391 on the rate of return are substantial. The impact of PD 1789 and BP 391 on most exporting firms' profitability are about the same except on pioneer expansion exporting enterprises which are more favored under the former incentive law. In general, PD 1789 incentives resulted in a higher increase in the rate of return of non-exporting firms than BP 391 incentives does.

BIBLIOGRAPHY

Berndt, E., "Reconciling Alternative Estimates of the Elasticity of Substitution", Review of Economics and Statistics, XLIII (February 1976).

Claque, C., "Capital-Labor Substitution in Manufacturing in Underdeveloped Countries", Econemetrica, 1969.

Coen, R., "Effects of Tax Policy on Investment in Manufacturing", American Economic Review, LVII (May 1968).

Gregorio, R. G. "An Economic Analysis of the Effects of Philippine Fiscal Incentives in the Philippines", in Romeo Bautista, John Power and Associates, Industrial Promotion Policies in the Philippines, Quezon City: Philippine Institute for Development Studies, 1979.

Hall, R. and D. Jorgenson, "Tax Policy and Investment Behavior", American Economic Review, LVII (June 1967).

Hooley, R. W., and G. P. Sicat, "Investment Demand in Philippine Manufacturing", UPSE Discussion Paper No. 67-2 (Revised June 1967).

Philippines. (Rep.) Investments Incentives Act: RA 5186, 1967.

Philippines. (Rep.) Export Incentives Act: PD 1789, 1981.

Philippines. (Rep.) Omnibus Investment Code: PD 1789, 1981.

Philippines. (Rep.) Investment Incentive Policy Act: BP 391, 1983.

Shah, S. M. S. and J. F. J. Toye, "fiscal Incentives for Firms in Some Developing Countries: Survey and Critique", in J. F. J. Toye, (ed.), Taxation and Economic Development, Great Britain: Billing & Sons Limited, Guildford, London & Worcester, 1978.

Sicat, G. P., "Industrial Production Functions in the Philippines", IEDR Discussion Paper No. 68-18, U. P. School of Economics (May 1968).

Williamson, J. G. "Capital Accumulation, Labor-Saving and Labor Absorption Once More, Quarterly Journal of Economics, LXXXV (February 1971).